

## REMARKS

Claims 1-36 are pending in the present application. In the Office Action, the Examiner objected to claims 4-7 because the operator “H” was not defined in the claim. Applicant respectfully submits that the “H” superscript is defined in the specification to indicate a conjugate transpose function. See Patent Application, page 6, ll. 8-18. Applicant further submits that there is no statutory requirement that notation that is defined in the specification also be defined in the claims. However, in the interest of expediting prosecution of the present application, Applicant has amended claim 4 to include the definition of the “H” superscript. Applicant respectfully submits that amending claim 4 to include this definition does not alter in any way the scope of claim 4. Thus, Applicant respectfully submits that claim 4 is clear and requests that the Examiner’s objection to claims 4-7 be withdrawn.

In the Office Action, claims 1-2, 4-6, 8-9, and 14-15 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over **Harrison** (U.S. Patent No. 6,154,485) in view of **Kalliojarvi** (U.S. Patent No. 6,121,927). Claims 3, 7, 20, 29-33, and 35-36 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over **Harrison** and **Kalliojarvi** in view of **Alamouti** (U.S. Patent No. 6,185,258). Claim 10 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over **Harrison** and **Kalliojarvi** in view of **Dabak**, et al (U.S. Patent No. 6,594,473). Claim 34 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over **Harrison** and **Kalliojarvi** in view of **Alamouti** and in further view of **Rice** (U.S. Patent Application Publication No. 2002/0172260). The Examiner’s rejections are respectfully traversed.

**Harrison** is concerned with receiving signals using combined orthogonal transmit diversity and adaptive array techniques. **Harrison** describes a coefficient  $\alpha$  that may allow a

base transmitter to smoothly transition between orthogonal transmit diversity mode and adaptive array mode. This smooth transition may allow the base transmitter to smoothly disable the adaptive array mode in proportion to the degradation of the quality of feedback data from a receiver. *See Harrison*, col. 8, ll. 23-35. However, as admitted by the Examiner, *Harrison* does not describe or suggest determining a code correlation parameter ( $\lambda$ ) based on an auto-correlation of a channel estimate.

*Kalliojarvi* describes correlating a channel estimate associated with the received signal with a reference channel estimate. The Examiner alleges that this may be considered an autocorrelation because the channel estimate is correlated with a reference version of itself. In particular, the Examiner states that the reference signal described by *Kalliojarvi* is one of the multipaths of the received signal and therefore the correlation described by *Kalliojarvi* is an autocorrelation. Applicant respectfully disagrees.

As previously stated, an autocorrelation function is applied to a *single* signal and/or data stream and not to two *different* signals and/or data streams. Although each of the multipath signals received by the antennas in the antenna array may reflect portions of a single signal transmitted by a transmitter, the multipath signals are not the *same* signal. To the contrary, as is well known in the art and as has been recognized in the references cited by the Examiner, the multipath signals received by the antennas in the antenna array are *different* signals that traveled from the transmitter to the antenna by *different* paths. For example, the multipath signals typically have different propagation times from the transmitter to the antenna and may experience different (potentially frequency-dependent) fading. In fact, *Kalliojarvi* teaches that it is the *differences* between the dispersed multipath signals that may permit the bearing of the received signal to be determined. *See, e.g., Kalliojarvi*, col. 2, line 62 – col. 3, line 5.

Consequently, Applicant maintains that **Kalliojarvi** teaches performing a *cross-correlation* of the multipath signals received by the antennas in the antenna array. Accordingly, Applicant respectfully submits that **Kalliojarvi** does not teach or suggest the use of an *autocorrelation* function.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. As discussed above, neither **Harrison** nor **Kalliojarvi** describes or suggests the use of an autocorrelation function. Accordingly, Applicant respectfully submits that the prior art references fail to teach or suggest all of the limitations of the claimed invention. Furthermore, **Harrison** is completely silent with regard to performing any type of correlation function and **Kalliojarvi** teaches that the channel estimate and the reference channel estimate should be *cross-correlated* to determine the bearing of a received signal. Accordingly, the combined references fail to teach each and every element of the claims and are therefore not the proper basis for an obviousness rejection.

The Examiner relies upon **Alamouti** to describe generation of an orthogonal code matrix. The Examiner also relies upon **Dabak** to describe a complex beamforming weight parameter having a magnitude and a phase, and **Rice** to describe using a look up table. However, these secondary references fail to remedy the fundamental deficiencies of **Harrison** and **Kalliojarvi**. Moreover, none of the cited references provide any suggestion or motivation to modify the prior art to arrive at Applicant's claimed invention.

For at least the aforementioned reasons, Applicant respectfully submits that the Examiner has failed to make a *prima facie* case that the present invention is obvious over **Harrison**, **Kalliojarvi**, **Alamouti**, **Dabak**, or **Rice** either alone or in combination. Applicant requests that

the Examiner's rejections of claims 1-10, 14-15, 20, and 29-36 under 35 U.S.C. 103(a) be withdrawn.

In the Office Action, the Examiner indicated that claims 11-13, 16-19, and 21-28 contain allowable subject matter, but the Examiner objected to these claims as being dependent upon a rejected base claim. Claims 11 and 16 have been rewritten in independent form including all the limitations of the base claim and any intervening claims. Claims 12-13 and 17-19 depend from the rewritten independent claims 11 and 16, respectively. Contrary to the Examiner's allegation, claims 21-28 are not dependent upon any rejected base claims. Accordingly, Applicant respectfully submits that claims 11-13, 16-19, and 21-28 are allowable and request that the Examiner's objections be withdrawn.

For the aforementioned reasons, it is respectfully submitted that all claims pending in the present application are in condition for allowance. The Examiner is invited to contact the undersigned at (713) 934-4052 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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